DOCUMENT RESUME

ED 212 237 HE 014 738

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TITLE The Economy and Student Enrollment in University Type Education.
PUB DATE Jul 81
NOTE 39p.; Study presented in partial fulfillment of a master's degree research project, Andrews University.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Comparative Education; *Economic Factors; Educational Attainment; *Enrollment Trends; *Foreign Countries; *Higher Education; Productivity
IDENTIFIERS *Europe (West); *Gross National Product

ABSTRACT

The relationship between the economy of noncommunist European countries and university enrollment over a period of ten years (1967-76) was studied, including the possibility of a causal relationship. Data were gathered from statistical publications of the United Nations; correlations were made by computer at a .05 level of significance. Gross domestic product per capita was used as the economic variable for Austria, Belgium, Denmark, Finland, Greece, West Germany, Ireland, Italy, Norway, Portugal, Spain, Sweden, and Switzerland. Percentage of the population enrolled in university education was the educational variable. Individual country results show a strong positive correlation between the two variables in all countries except Sweden. Graphs illustrate the separate patterns of the two variables during the period in question. No causal relationship was found between the variables, however, and the results are not felt to have much practical value. Further research is suggested. A brief bibliography and the survey letters used are included. (MSE)

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ABSTRACT

THE ECONOMY AND STUDENT ENROLLMENT IN UNIVERSITY TYPE EDUCATION

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Arni Thor Hilmarsson

Project Adviser: Thesba Johnston

HE014738

PROBLEM

Much has been written on the interplay between education and the factors that influence the size of educational systems. Very little has though been researched about direct influences of the economy upon student enrollment and vise versa.

The purpose of this study is to investigate if there is a relationship between the economy of countries in non-communist Europe and student enrollment in university type education over a period of ten years. If there is a relationship the study will attempt to find out if there is a possible cause-effect relationship.

METHOD

The data were generated from the statistical publications of the United Nations.

The study was a correlational study, correlating two variables with the help of a computer.

Level of significance was determined to be at the .05 level.

RESULTS

The results showed a significant positive correlation between the research variables in twelve of the thirteen countries studied. Significant positive corre-

lation was also obtained when a correlation was calculated for the countries combined. Levels of significance were all beyond the .01 level where statistical significance was obtained.

Graphs were drawn to investigate the possibility of a cause-effect relationship. That investigation did not support that such a relationship exists.

CONCLUSION

In spite of high positive correlations obtained, the results do not have much practical value. More research has to be done on factors that influence economic growth and student enrollments.

Andrews University
School of Graduate Studies

THE ECONOMY AND STUDENT ENROLLMENT IN UNIVERSITY TYPE EDUCATION

A Project
Presented in Partial Fulfillment
of the Requirements for the Course
EDUC698, Master's Research Project

by
Arni Thor Hilmarsson
July, 1981

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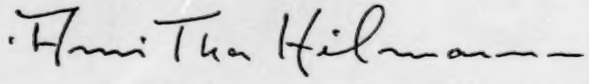
ACKNOWLEDGMENTS

I would like to extend my sincere thanks and appreciation to; Thesba Johnston for guiding me through this experience, Robert Williams who inspired me to take on this project, and Bernard Lall whose help, during the final steps of this project, was priceless. I would also like to give my thanks to my parents, Hilmar and Valgerdur Thorarinsson, whose financial support has helped me through higher education, and to whome I dedicate this project.



INTRODUCTION

In this age of crisis, inflation, and high unemployment, young people are concerned when they select future occupation about what quality of life it will bring them. It is not enough to have a high paying degree if the diploma is unlikely to provide employment. As the employment market changes, the young people try to adjust their selection of educational fields accordingly. In regards to demand O'Donoghue points out:

> On the demand side little is known about the factors which influence the amounts and types of education sought by people. Nor is it known how such demands are in turn linked to the demand and supply of educated manpower in the labour market; so that little of a positive nature can be advanced concerning the economic element in individual motivation for education.[1]

Does declining economy encourage enrollment in long-term education such as university type education, or in short-term education such as vocational school?

Janne (1979) states that people have tended to value the traditional prestige of the university as the best social and economic investment.[2] Thus higher

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[1]Martin O'Donoghue, Economic Dimensions in Education (Dublin, Ireland: Gill and Macmillan, 1971), p. 218.

[2]Henry Janne, Education and Youth Employment in Belgium (California: The Carnegie Foundation for the Advancement of Teaching, 1979), p. 41.

education in a period of widespread unemployment is, economically at least, a "parking institution."[1]

Geiger (1980) in his study of higher education in Belgium, France, Japan, and the United States reports that educational and career demand from all ability levels has caused increasing meritocratic selection in programs with surest and largest career rewards, and that for students with neither high ability nor high socio-economic status educational demand has largely been diverted to shorter programs or non-university programs.[2] Geiger traces the development of enrollment the last decades in a following way:

> The economic boom of the fifties and sixties stimulated the demand for education in a number of ways. Increased personal wealth translated rather directly into higher parental ambitions for their children's education. Economic growth produced more positions in industry for highly trained personnel. But, more importantly for the educational system, the increase in social wealth spun off by industrial development led to substantial expansion in the education-intensive service sector. The growing demand for university graduates thus encouraged an increasing number of students to attend, and apparently exorcised once and for all the spectre

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[1] Janne, p. 43.

[2] Roger Geiger, The Limits of Higher Education: A Comparative Analysis of Factors Affecting Enrollment Levels in Belgium, France, Japan, and the United States (Conn.: Institute for Social and Policy Studies, Yale University, 1980), p. 1.

> of "intellectual unemployment" that had haunted Europe in the 1930s. From the standpoint of higher education the most important growth industry was education itself.[1]

To the reasoning that in hard times students seek security in practical and marketable studies (non-university) Geiger responds:

> While there is undoubtedly some truth to this, there is also good reason not to accept this as the principal explanation. For one thing, university enrollments leveled off before economic difficulties were felt (in Belgium); for another, economic downturns stimulated demand for higher education as an alternative to unemployment.[2]
>
> Moreover, those with more education are still better off in terms of earnings and rates of unemployment, even though differentials may be narrowing.[3]

A study of the Development of Higher Education 1950-1967 presents a positive correlation between enrollment rates in higher education and Gross National Product per capita (0.6775 in 1955 and 0.6527 in 1965).[4] In spite of these results the study concludes that "the influence of economic variables seem to be minor or

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[1]Geiger, p. 2.

[2]Ibid, p. 13.

[3]Ibid, p. 3

[4]Development of Higher Education 1950-1967, - Analytical Report (Paris, France: Organization for Economic Cooperation and Development, 1971), p. 58.

Definition of terms.

Gross National Product: An accounting measure of the total output of goods and services.

Gross Domestic Product: An adjusted measure of the Gross National Product.

Third Level Education: University type education, post secondary education.

very indirect, therefore the expansion of higher education in no way depends on the level of economic develcpment or on fluctuations in the growth of National Product."[1]

In this review three opinions have been presented; a) poor economy stimulates university enrollment, b) poor economy discourages university enrollment, and c) the economy has no influence on university enrollment. None of the studies discussed show any conclusive research that will support substantially any of these possibilities. The studies that have been done have dealt with either very few countries over a long period of time or many countries in the same year. The purpose of this study is to study the economic variable in thirteen countries over a decade, in order to find out its relationship to student enrollment in university type education.

The research hypothesis is (H_1): There is a statistically significant correlation between the Gross Domestic Product per capita and student enrollment in university type education. The null hypothesis is therefore (H_0): There is not a statistically significant correlation between the Gross Domestic Product per capita and student enrollment in university type education.

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[1] Development....., p. 64.

METHODS

The study was done on thirteen non-communist European countries. These countries are: Austria, Belgium, Denmark, Finland, Greece, W-Germany, Ireland, Italy, Norway, Portugal, Spain, Sweden and Switzerland. The countries were selected because of convenience. Data were easily obtainable for these countries while they were not easily obtainable, or not obtainable at all from other non-communist countries in Europe. An exception is Great Britain on which data was obtainable for portions of the country (England, Scotland, Wales), but not for the unified whole.

Data collected were over the ten years period 1967-1976.

In order to get comparable results for the thirteen countries with different sizes of population this study correlates the Gross Domestic Product per capita and the percentage of the population enrolled in university type education.

> There are many conceivable measures of the economic well-being of society. It is generally agreed however, that the best available indicator of an economy's health is its annual total output of goods and services or, as it is sometimes called, the economy's aggregate output. The basic social accounting measure of the total output of goods and services is called the gross national product or, simply, GNP. It is defined as the total market value

> of all final goods and services produced in the economy in one year.[1]

In the light of this paragraph this study is fully justified in using an adjusted measure of the Gross National Product, namely Gross Domestic Product, as its measure of economic growth. To avoid the thirteen countries this study uses the Gross Domestic Product per capita as the basis for the economic status. Figures used in this variables are copied directly from the Yearbooks of National Accounts Statistics.[2]

The other variable, student enrollment in university type education, is more complicated. It is obvious that a proportion should be used since the populations are of various sizes. To use the proportion of the eighteen to twenty-two years old group in universities was possible but by doing so the study would have ignored the vast amount of other age groups that are preparing for a future occupation in a university type education. To use the transfer rate from secondary school to university type education invites even more complications. This study therefore uses as the second variable, percentage of the total population en-

---

[1]Campell R. McConnel, Economics, 7th ed. (New York: MCGraw-Hill, Inc., 1978), p. 169.

[2]The Yearbook of National Accounts Statistics. (New York: United Nations Publishing Service).

rolled in university type education. The percentage figures are calculated by the use of enrollment figures obtained from the Statistical Yearbooks,[1] and population figures obtained from the Demographic yearbooks.[2]

The figures for the university type institutions include universities and equivalent institutions (degree-granting), but exclude teacher-training at the third level in non-university institutions (teacher training colleges, etc.) and other education at the third level in non-university institutions (technical colleges, etc.).[3]

Correlations were calculated by the help of XEROX, Sigma 6 computer. Correlations were calculated for each country separately over the ten years period, 1967-1976, at first, and then for all of the countries combined over the same period of time.

Level of significance for the rejection of the null hypothesis was set at the .05 level.

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[1] Statistical Yearbooks, 1970, 1971, 1974, 1975, 1980. (Paris, France: United Nations Educational, Scientific, and Cultural Organization, 1971, 1972, 1975, 1981).

[2] Demographic Yearbooks 1974, 1978. (New York: United Nations Publishing Service, 1975, 1979).

[3] Statistical Yearbook, 1976, p. 337.

Then graphs are drawn to get a clearer picture of fluctuations in the variables, under investigation, for the period from 1967 to 1976. This is done to see if there is a sharp increase in one variable preceding a sharp increase or decrease in the other variable, and if there is a sharp decrease in one variable preceding a sharp increase or decrease in the other variable. Such results would be interpreted as possible cause-effect relationships.

ANALYSIS OF RESULTS.

The results of the correlations for the countries individually show that there is a strong correlation between the Gross Domestic Product per capita and student enrollment in university type education, over the period 1967-1976, in all the countries except Sweden. Twelve of the countries have a positive correlation higher than .835, but Sweden has a negative correlation of .013. The correlation of the countries combined is. 475 for the same period.

Table I

The correlation between the economic and the student enrollment in university type education variables.

Countries	r.	n	p≤
Austira	.922	10	.001
Belgium	.860	10	.01
Denmark	.806	10	.01
Finland	.977	10	.001
Greece	.953	10	.001
W-Germany	.978	10	.001
Ireland	.864	10	.01
Italy	.927	10	.001
Norway	.897	10	.001
Portugal	.836	10	.01
Spain	.975	10	.001
Sweden	-.013	10	
Switzerland	.960	10	.001
Total	.475	130	.001

The results from this study support the rejection of the null hypothesis and that the research hypothesis is

retained. As the table shows the level of significance is far beyond the .05 level that was set up at the beginning.

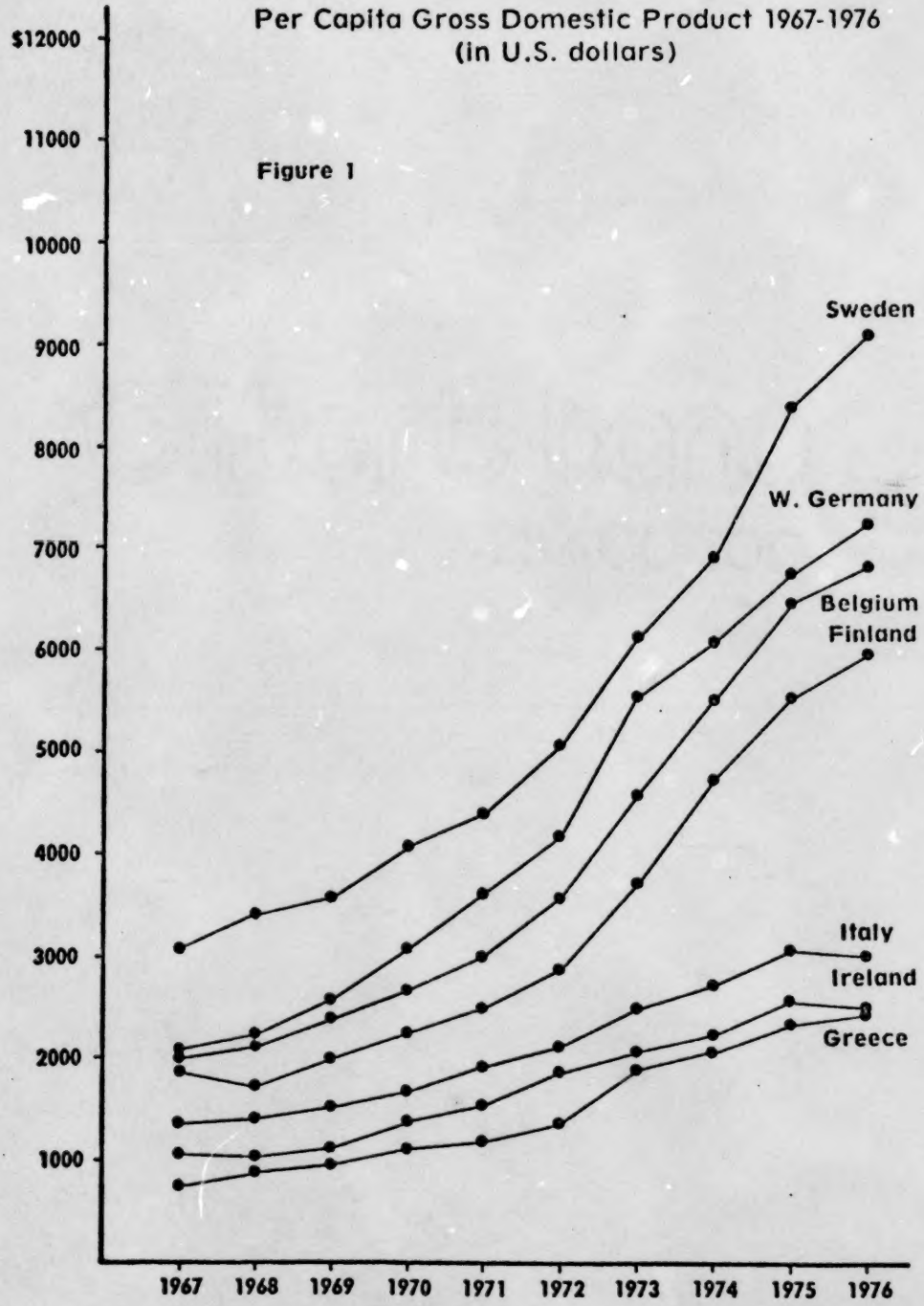
It is not adequate to infer these results to countries outside non-communist Europe since they were not represented in the study.

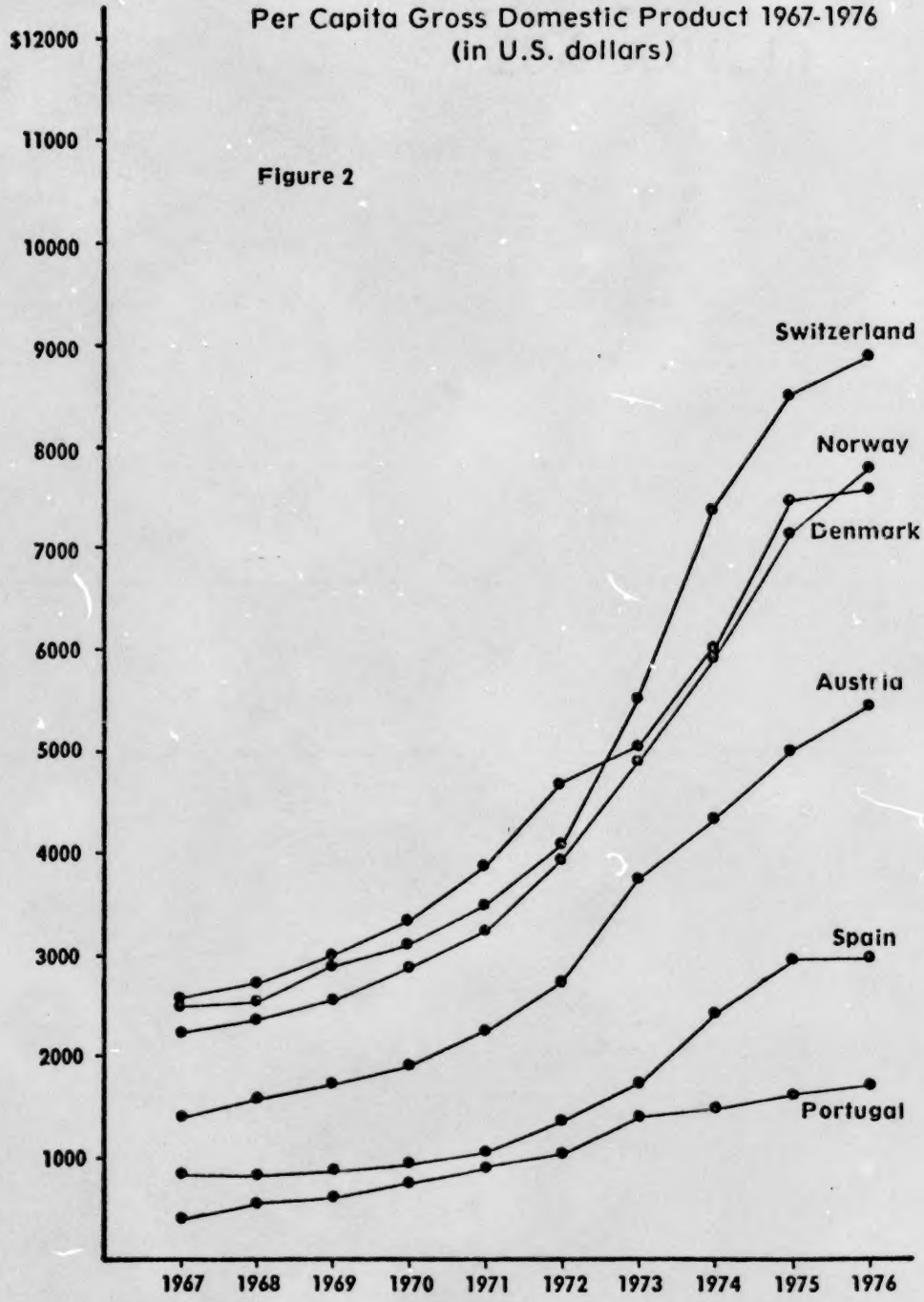
The findings are rather consistent within each country except for Sweden. One may think that Sweden's outcome is responsible for the lower correlation of the total but that is not true. A correlation of all the countries except Sweden was run with very similar results. The economies of these countries are different and national income rests on different sectors of their economies. Denmark is, for example, largely agricultural while Sweden is highly industrial, and Norway has a long history of fishing besides having recently been blessed with the discovery of rich oilfields in the North Sea. One country's economy may stimulate enrollment more than the economy of another country because of the different nature of the production. Some industries, for example, require more people with university type education than others. Denmark's beer and cheese production needs people with different education from Sweden's Saab factories which produce cars and fighter jets. Portugal's wineries and seafood canning industry require people with different education from the Pierpont and Omega watch factories in Switzerland.

This study does therefore not give indications to how big the university education sector should be in a "developed" country, because there is not such rule established. Each country has its own needs.

This study rejects the hypothesis that there is no significant correlation between the GDP per capita and proportion of the population in university type education. The rejection of the null hypothesis gives reason to investigate further if there are cause-effect relationships in the economy-university type education variables. Such studies could be very useful for countries that want to influence either one variable or the other for desired ends.

Graphs were drawn of the percentage of students enrolled in university type education, 1967-1976, in the individual countries and also of the economic situation, over the same period of time in the individual countries, as indicated by the Gross Domestic Product per capita. The reason for this was to get a clearer picture of the changes in the growth rates of each variable, and to see if a sudden growth in one variable preceded a sudden growth in the other variable. If that would be the case, a cause-effect relationship would be demonstrated by an increase in one variable preceding an increase in the other variable, or a decrease in one variable preceding a decrease in the other variable.


Per Capita Gross Domestic Product 1967-1976
(in U.S. dollars)
Figure 1
$12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
Sweden
W. Germany
Belgium
Finland
Italy
Ireland
Greece


Per Capita Gross Domestic Product 1967-1976
(in U.S. dollars)
Figure 2
$12000
11000
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1967
1968
1969
1970
1971
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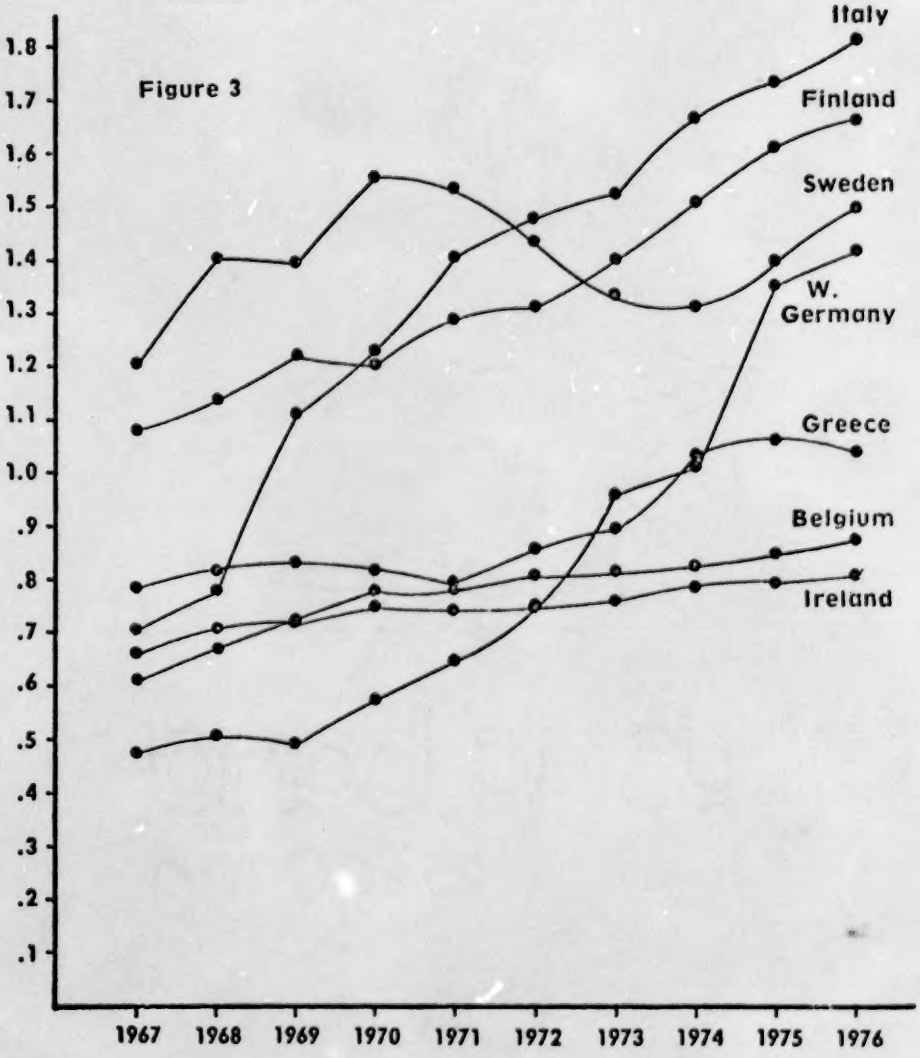
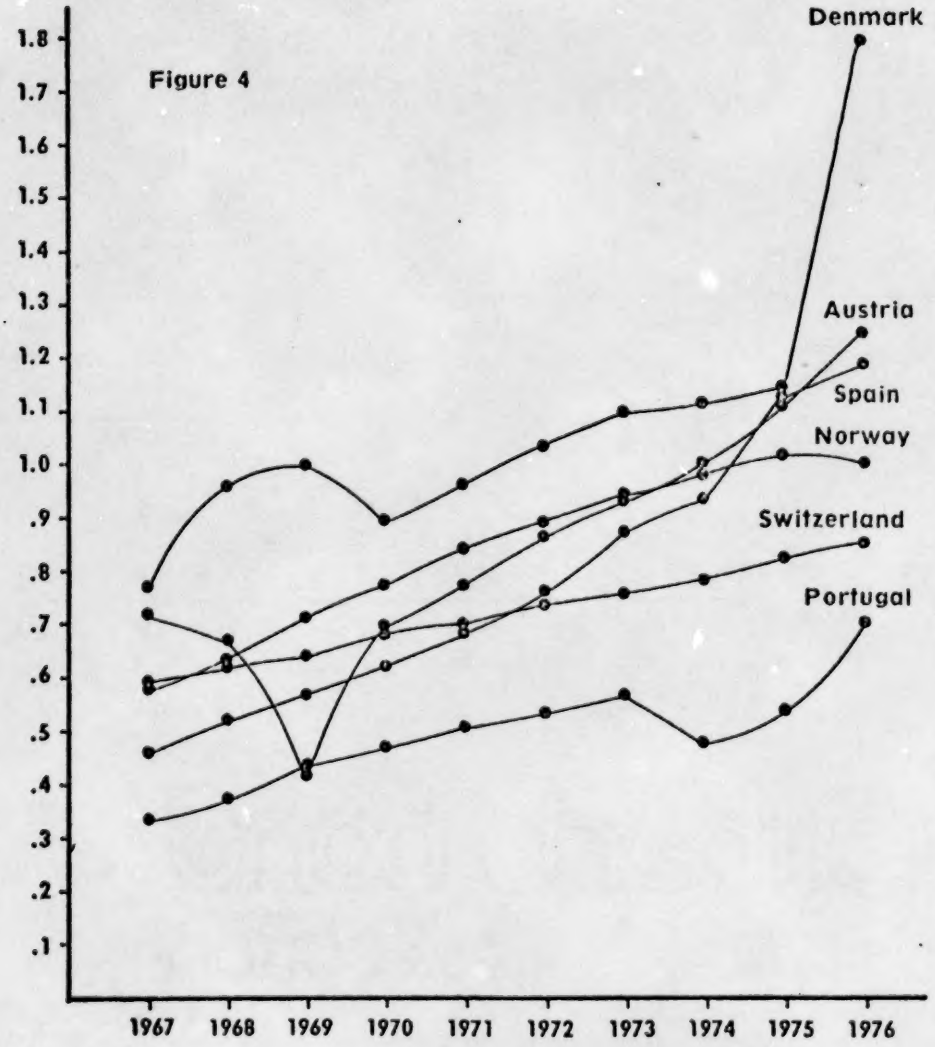
1976
Switzerland
Norway
Denmark
Austria
Spain
Portugal

Percentage of Students enrolled in
University Type Education 1967-1976



Percentage of Students enrolled in
University Type Education 1967-1976



Denmark: A sudden increase in enrollment does precede a relative increase in the growth of the Gross Domestic Product. The sudden increase in enrollments in university type education in 1976 is probably due to a change in the Danish educational system, making it easier for students on the secondary level to extend their education into the universities. Note, though, that this did not happen in Norway and Sweden but those countries also changed their educational systems the same way at the same time.

Norway: Two sharp growth periods in the Gross Domestic Product per capita precede a decline and a stop in the growth rate of enrollment.

W-Germany: A sharp growth rate in the Gross Domestic Product precedes an enormous growth in the rate of enrollments.

In the other countries fluctuation in one variable were not accompanied by noticeable fluctuations in the other variable. There is no reason at this point to assume that the relationship between the two variables is a cause-effect relationship.

DISCUSSION

The economic difficulties that face the nations in non-communist Europe are nowhere close in seriousness to the economic difficulties that face the "Third World." Many of the Third World nations put heavy emphasis on education in the hope that it will later boost the economy.

> Out of 100 children entering primary school in developing countries, only 30 finish, and those who graduate from this or from higher levels of schooling frequently fail to find the employment they expect.
>
> "Education is still far from making the contribution of modernization of which it is capable."[1]

It is necessary to investigate the cause-effect relationship between economy and education. A country may find itself in a situation where there is a risk for the government leaders in where to put the emphasis.

> ... a dollar or a rupee invested in the intellectual improvement of human beings will often bring a greater increase in national income than a dollar or a rupee devoted to railways, dams, machine tools, or other tangible capital goods.[2]

And

> Only as increased production income is available

---

[1]James Nelson,"World Bank Reorganization Recommended," The Leader Post (Regina, Saskatchewan, Canada), Oct. 1, 1969, P. 25.

[2]John K. Galbraith, Economic Development (Boston: Houghton Mifflin Company, 1964), p. 79.

> does good education become possible. Only from this will there be wherewithal to support schools and colleges and universities. Economic growth is necessary if a nation is to pay for schools and teachers.[1]

From these two paragraphs it can be seen that a poor country, economically, could find itself in the position of not having the disposable income necessary to take on the task of establishing a large scale educational system. It makes it even less desirable when the outcome could be a gamble.

> Again, there is, if anything, even greater ignorance regarding the economic benefits occurring to the community from the presence of educated people. Not only is there uncertainty as to the nature of such benefits. There is even doubt as to whether they are positive or negative, though the balance of opinion favours the former view.[2]

The practical value of a high correlation between the two variables in this study is that it can be used as a predictor, in spite of the presence or absence of a cause-effect relationship. One of the variables can be a good predictor of the other although a third variable or a set of variables are responsible for the growth or decline of the variables in question. Take for example the country of Finland. For the 1967-1976 period the standard deviation of the "Gross Domestic Product per capita" variable was 1599.66

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[1]Galbraith, p. 77.

[2]O'Donoghue, p. 218.

(U.S. $). The standard deviation of the "enrollment variables" was 190.32 (for proportion of 100,000).

The Gross Domestic Product per capita in 1977, in Finland, was $ 6654 (U.S.). By using regression prediction it can be predicted that student enrollment in university type education in Finland was between 1664 and 1823 students out of every 100,000 habitants with 95 percent certainty (the number turned out to be 1728 in 1977). Since in real life one has to rely on predicted Gross Domestic Product per capita, one has to calculate from the lower and the higher limits of the predicted Gross Domestic Product per capita to get the desired confidence interval of the predicted score (enrollment ratio). This widens considerably the interval which is likely to contain the predicted number.

It is rather unlikely that regression prediction based on Gross Domestic Product per capita will ever be used to predict total enrollment in university type education. The first disadvantage is that the predictor needs to be predicted before it can be used to predict. Secondly, predicting from an interval is much more vague than predicting from a direct measure. Thirdly, the value of knowing total enrollment figures ahead of time without knowing the division into specific fields is of questionable worth to the school administrator, because it does

not indicate how the students will divide into fields and can therefore not aid in hiring teachers with needed credentials.

A relatively accurate prediction of the Gross Domestic Product can be made when two quarters of the calendar year has passed by and that measure can be used to predict enrollment in the autumn the same year. The problem with such practice is that there is a better way, of making an estimate for the coming schoolyear, already used. Most university type institutions list a deadline for applications to be sent in several months before the schoolyear starts. That way they know ahead of time how many have applied, been accepted, and in which fields of study they inted to enter so arrangements for possible changes can be made with reasonable certainty.

SUMMARY

A study was done on the correlations between the Gross Domestic Product per capita and the percentage of the population in university type education, in thirteen non-communist countries over a period of ten years (1967 -1976). Results showed that there was a significant positive correlation between these two variables.

Graphs were drawn to investigate if there was a possible cause-effect relationship between the two variables. Comparison of these graphs did not support any such relationship.

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The following are communications between the author of this project and various General Consulates concerning this project.

June 24, 1981

Dear Sirs

I am a graduate student in Education at Andrews University, Michigan. I am doing a study on economical factors and trends in university enrollment in various countries. Your country happens to be one of them.

I have had quite some difficulties in obtaining the information that I need for this project, and I turn to you for help.

The information I need is for each year from 1966 to 1979. The information is on:

a) total population figures
b) population figures for 18-22 years old
c) total enrollment figures for universities
d) new enrollments to universities
e) certificates to university education
f) university enrollment figures for the 18-22 year old group.

Even if all these figures are not available, any portion of them will help. I will pay for any expense resulting from this.

In return for your cooperativeness I would like to send you a copy of my study, when completed.

With Sincere Appreciation

Arni T Hilmarsson
511 Rose Hill Rd., box 8
Berrien Springs
MI 49103
ph: (616) 471-4786

35.H.1.

TEL. (212) 686-4100

CONSULATE GENERAL OF ICELAND
370 LEXINGTON AVENUE
NEW YORK, N. Y. 10017

July 2, 1981

Mr. Arni T. Hilmarsson
511 Rose Hill Rd., box 8
Berrien Springs
Mi 49103

Dear Mr. Hilmarsson,

In response to your letter dated June 24, 1981, we are sending you enclosed official statistics from Iceland. This will answer the inquiries in your letter.

The information about the schools and the educational system in Iceland is from the Official Statistic Bulletin, February issue 1979. Since your name is Icelandic we presume that you will be able to use the Icelandic article.

Sincerely yours,

Ivar Guðmundsson
Consul General

Generalkonsulat
der Bundesrepublik Deutschland
Consulate General
of the Federal Republic of Germany

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Telex 23-0716

July 21, 1981
B/M

Mr. Arni T. Hilmarsson
511 Rose Hill Rd., Box 8
Berrien Springs, MI 49103

Ku 625.19
(Bitte bei Antwort angeben)
(When replying please quote)

Dear Mr. Hilmarsson:

I acknowledge receipt of your letter of June 24, 1981 which has been forwarded to this Consulate General serving the State of Michigan.

Enclosed please find some information about higher education in Germany.

For more detailed information, however, you would have to contact the German Federal Ministry of Education and Science. The address is as follwos:

Der Bundesminister für Bildung
und Wissenschaft
Heinemann Str. 2
5300 Bonn 2
Federal Republic of Germany.

Sincerely,

Wolfgang Bergner

Encl.

With the Compliments of the

CONSULATE GENERAL OF FINLAND

FINLAND HOUSE
540 Madison Avenue, New York, N.Y. 10022
Telephone: 832-6550

Dear Mr. Hilmarsson,

With reference to your letter of June 24, enclosed please find "Statistical yearbook of Finland" where you can find the information you need. For further information you can contact directly Central Statistical Office, the address is
Annankatu 44
00100 Helsinki 10
Finland

Sincerely yours,

Please address your inquiry to:
Ministere de l'Education Nationale
6, Boulevard Royal
Luxembourg
Grand Duchy of Luxembour
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NEW YORK, N. Y. 10017
(212) 751-9650

CONSULATE GENERAL OF IRELAND
400 N. MICHIGAN AVENUE
CHICAGO, ILLINOIS 60611
TEL. 337 1868

Dear Mr. Hilmarsson,

The population census figures for the period 1971-1981 have not been published. For more detailed information on university enrolement in Ireland you should contact the universities directly. I enclose a list of them.

Forwarded with the Compliments of
the Consul General of Ireland, at Chicago

Gail Cusack

Gail Cusack
For Consul

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